Outcomes After Joint Arthroplasty and Ankle Arthrodesis in Patients with Haemophilia

Dr Kemble Wang
Miss Susan Liew
A/Prof Alison Street
Dr Adam Dowrick.

Department of Orthopaedic Surgery, in conjunction with the Department of Haematology, Alfred Hospital, Melbourne, Australia.
Haemophilic Arthropathy

- Initiated by recurrent bleeding and synovial thickening
- Vicious cycle often with ‘target’ joint
- Knees, ankles, elbows most common
- High burden of disease
Factor Prophylaxis and Arthropathy

- Significantly changed the nature and management of disease.

- However,
  - Less benefit unless applied at very young age
  - Administration issues in the young
  - Cost
  - Traumatic bleeds
  - Inhibitors
Joint Arthroplasty in Haemophilia

- Data predominantly in TKR
  - Improvements in pain but variable improvements in post operative function
  - Higher infection rates in HIV+ patients
  - Follow up <10 years in most studies
  - Limited data in patient oriented outcomes
Joint Arthroplasty in Haemophilia

- THR
  - Some pain relief and improvements in function
  - Higher complication and revision rates
    - Recent reports more favourable
- Other joints
  - Elbow replacement
  - Shoulder replacement
  - Ankle arthrodesis
Aims

- To investigate outcomes of haemophilic joint replacements and ankle arthrodeses in an Australian setting
  - Long term outcomes
  - Complications
  - Post operative functional status
  - Patient oriented outcomes
    - Satisfaction with surgery
    - Quality of life
  - Comparison between different joints
Patients and Methods

- Patients with haemophilia A or B
- Joint replacement or ankle arthrodesis between 1985 and 2008
Patients and Methods

- Retrospective review of patient histories
- Assessment of outcomes (live patients)
  - Patient Questionnaires
  - Clinician Assessment
Follow up

- Average follow up: 11.0 years (range: 1-22 years)
- Single institution
- Multiple surgeons (consultant/registrar)
- All elective
- 1 clinician assessor
Results

- 55 patients
  - Total of 86 joint procedures
- 23 of 55 patients deceased as of July 2009
  - Still included for complication analysis
- 30 of 33 live patients interviewed and examined (follow up rate = 91%)
Haemophilia Type

![Bar chart showing the distribution of Haem A and Haem B types. Haem A has a count of 45, while Haem B has a count of 10.]}
Haemophilia Severity

- Severe (<1%) 68%
- Moderate (1-5%) 7%
- Mild (>5%) 25%
HIV status

- HIV+:
  - 17

- HIV-:
  - 38
HCV status at time of OR

- HCV +: 35
- HCV -: 20
Joints

- 41 knee replacements in 32 patients
- 18 hip replacements in 15 patients
- 6 elbow replacements in 3 patients
- 21 ankle arthrodeses in 13 patients
  - 17 tibiotalar
  - 4 subtalar

- Total – 86 procedures in 55 patients
## Complications - Knees

<table>
<thead>
<tr>
<th>Complications (of total 41 TKRs)</th>
<th>Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Culture proven deep infection</td>
<td>6</td>
</tr>
<tr>
<td>Failure to regain motion (offered MUA)</td>
<td>7</td>
</tr>
<tr>
<td>Large post op bleed requiring evacuation of clot</td>
<td>4</td>
</tr>
<tr>
<td>Aseptic loosening requiring revision</td>
<td>2</td>
</tr>
<tr>
<td>Intraoperative posteromedial corner #</td>
<td>1</td>
</tr>
<tr>
<td>Post operative periprosthetic # secondary to minimal trauma</td>
<td>1</td>
</tr>
<tr>
<td>Total Complications</td>
<td>21</td>
</tr>
</tbody>
</table>
Complications – Knees – Infections

- 6 culture proven deep infections
  - MSSA x4, MRSA x1, Group G strep x1
  - Average time between arthroplasty and identification of infection
  - 3.6 years (range 56 days to 11.2 years)

- Outcomes
  - Above knee amputation 2
  - Removal, cement spacer, then redo 1
  - Removal and eventual fusion 2
  - Resolved with washout and IV abx 1
## Complications – Knees – Infections

<table>
<thead>
<tr>
<th></th>
<th>Current Study</th>
<th>Other Reports</th>
</tr>
</thead>
<tbody>
<tr>
<td>General population infection rate</td>
<td>-</td>
<td>1-2%</td>
</tr>
<tr>
<td>Haemophilia population infection rate</td>
<td>14.6% (6/41)</td>
<td>5-18%</td>
</tr>
<tr>
<td>HIV+ infection rate</td>
<td>20% (2/10)</td>
<td>10-29%</td>
</tr>
<tr>
<td>HIV- infection rate</td>
<td>10.3% (4/39)</td>
<td>0-13%</td>
</tr>
</tbody>
</table>

Survival rates - Knees

**Survival rates at 10 years**
- Survival free of component removal = 83%
- Survival free of infection = 88%
- Survival free of mechanical failures = 95%
## Complications - Hips

<table>
<thead>
<tr>
<th>Complications (of total 18 THRs)</th>
<th>numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intraoperative periprosthetic # picked up on post op XR</td>
<td>1</td>
</tr>
<tr>
<td>Transient sciatic nerve palsy resolved by 3/12</td>
<td>1</td>
</tr>
<tr>
<td>Periprosthetic # secondary to post operative trauma (required ORIF)</td>
<td>2</td>
</tr>
</tbody>
</table>

9 cemented, 9 uncemented THRs
Complications - Hips

- Only 3 out of 18 cases requiring reoperation
- No infections, no aseptic loosenings
- However, shorter follow up than TKRs (mean = 5.5 vs 12.8 years)
Complications - Elbows

- 6 elbow replacements in 3 patients
  - 1 case of triceps avulsion diagnosed at 3 years
    - repaired with good function
  - 1 case of humeral component aseptic loosening at 5 years
    - revision then intraoperative periprosthetic # humeral epicondyle. ORIF. Now stiff.
## Complications - Ankles

### Complications (of total 21 ankles) | numbers
--- | ---
Stenosing synovitis of FHL requiring removal of screw | 1
Equinus malunion requiring revision | 1
Fibulotalar impingement requiring revision | 1
Deep infection and subsequent Achilles rupture requiring repair | 1
Delayed union (>12month) | 1
Stress # in other foot secondary to POP and NWB | 1
Irritating screws requiring removal | 2
Distal tibia # just proximal to fusion requiring revision | 1
Complications - Ankles

- In all, 9 of 21 (43%) ankles had significant complications
  - 7 of 21 (33%) requiring revision or reoperation
  - All complications in tibiotalar fusions
## Complications – All Joints

<table>
<thead>
<tr>
<th>Description</th>
<th>Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total procedures</td>
<td>86</td>
</tr>
<tr>
<td>Total significant complications</td>
<td>43</td>
</tr>
<tr>
<td>Total number of re-operations</td>
<td>48</td>
</tr>
<tr>
<td>Total number of re-admissions for complications</td>
<td>40</td>
</tr>
</tbody>
</table>
Pain relief

- Patients were asked to retrospectively rate pain in 3 periods
  - 1) worst pain in the 4 weeks leading up to their joint operation
  - 2) worst pain in the 4 week period one month after the operation
  - 3) worst pain in the last 4 weeks
## Pain Scores (Mean)

<table>
<thead>
<tr>
<th></th>
<th>TKR</th>
<th>THR</th>
<th>Ankle fusion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Period 1</strong></td>
<td>7.0</td>
<td>8.5</td>
<td>8.7</td>
</tr>
<tr>
<td><strong>Period 2</strong></td>
<td>4.3</td>
<td>2.4</td>
<td>5.0</td>
</tr>
<tr>
<td><strong>Period 3</strong></td>
<td>0.6</td>
<td>0.9</td>
<td>3.0</td>
</tr>
</tbody>
</table>
# Post Operative Joint Scores - Knee

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Current study (mean)</th>
<th>Other Reported (range)</th>
<th>Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexion arc (incl. 2x fusions)</td>
<td>60.3°</td>
<td>75° - 92.2°</td>
<td>-</td>
</tr>
<tr>
<td>Fixed flexion contractures</td>
<td>5.8°</td>
<td>5.6° - 10°</td>
<td>-</td>
</tr>
<tr>
<td>Oxford Knee Score</td>
<td>36.5</td>
<td>-</td>
<td>&gt;40: Excellent</td>
</tr>
<tr>
<td>Knee Society Score – Knee Score</td>
<td>79.7</td>
<td>75.7 - 82.8</td>
<td>&gt;80: Excellent</td>
</tr>
<tr>
<td>Knee Society Score – Functional Score</td>
<td>57.1</td>
<td>75.8 – 96.2</td>
<td>&gt;80: Excellent</td>
</tr>
</tbody>
</table>

# Post Operative Joint Scores - Hip

<table>
<thead>
<tr>
<th></th>
<th>Current Study</th>
<th>Other Reported</th>
<th>Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxford Hip Score</td>
<td>38.1</td>
<td>-</td>
<td>&gt;40: Excellent</td>
</tr>
<tr>
<td>Harris Hip Score</td>
<td>69.5</td>
<td>85 - 95.9</td>
<td>&gt;90: Excellent</td>
</tr>
</tbody>
</table>

### Post Operative Joint Scores - Ankle

<table>
<thead>
<tr>
<th></th>
<th>Current Study</th>
<th>Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Foot and Ankle Score (n=11)</td>
<td>61.1 ± 9.5</td>
<td>&gt;90: Excellent</td>
</tr>
</tbody>
</table>
## Post Operative Joint Scores - Elbow

<table>
<thead>
<tr>
<th></th>
<th>Current Study</th>
<th>Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quick-DASH (n=6)</td>
<td>30.3 ± 23.0</td>
<td>&gt;90: very poor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;10: Excellent</td>
</tr>
</tbody>
</table>

- 5 of the 6 elbows scored between 13 and 23
- One elbow scored 89 due to recent bleed
# Functional Independence Score in Haemophilia

<table>
<thead>
<tr>
<th></th>
<th>Current Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>FISH</td>
<td>20.3 ± 3.1</td>
</tr>
</tbody>
</table>
# Quality of Life

-SF12 based on index joint

<table>
<thead>
<tr>
<th></th>
<th>Physical Score</th>
<th>Mental Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>all (n=31)</td>
<td>34.0 (30.1-38.0)</td>
<td>54.0 (50.3-37.6)</td>
</tr>
<tr>
<td>knee (n=16)</td>
<td>36.9 (31.9-41.8)</td>
<td>53.5 (48.8-58.1)</td>
</tr>
<tr>
<td>hip (n=9)</td>
<td>31.6 (23.6-39.6)</td>
<td>54.6 (45.9-63.3)</td>
</tr>
<tr>
<td>ankle (n=6)</td>
<td>30.2 (20.6-39.8)</td>
<td>54.3 (46.1-62.5)</td>
</tr>
<tr>
<td>Age matched general population</td>
<td>47</td>
<td>51</td>
</tr>
<tr>
<td>Post TKR non haemophilia</td>
<td>55.1</td>
<td>51.7</td>
</tr>
</tbody>
</table>

Nunez at al, Arthritis & Rheum. 7 years post TKR
# Patient Satisfaction

<table>
<thead>
<tr>
<th></th>
<th>Mean satisfaction score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knee</td>
<td>1.75</td>
</tr>
<tr>
<td>Hip</td>
<td>1.33</td>
</tr>
<tr>
<td>Ankle</td>
<td>2.0</td>
</tr>
</tbody>
</table>

1 = very satisfied, 2 = mostly satisfied, 3 = somewhat satisfied, 4 = dissatisfied
Patient Satisfaction

- Satisfaction with pain relief:
  - Very satisfied: 73%
  - Mostly satisfied: 24%
  - Somewhat satisfied: 3%
  - Dissatisfied: 3%

- Satisfaction with function:
  - Very satisfied: 48%
  - Mostly satisfied: 28%
  - Somewhat satisfied: 17%
  - Dissatisfied: 7%

- Overall satisfaction with operation:
  - Very satisfied: 52%
  - Mostly satisfied: 38%
  - Somewhat satisfied: 7%
  - Dissatisfied: 3%
Patient Satisfaction

Correlation coefficient $r = 0.31$, $p > 0.05$

Y axis: 1= very satisfied, 2= mostly satisfied, 3= somewhat satisfied, 4= dissatisfied
Summary

- Higher rates of complications
  - Higher infection rate and reoperation rate
- Acceptable prosthesis survival rate
- High reoperation rate following ankle arthrodesis (43%)
- Excellent relief of pain
  - TKR > THR > Ankle arthrodesis
- Moderate functional outcomes
- Overall patient satisfaction is high despite complications
Many thanks to…

- Miss Susan Liew
  - Head, Department of Orthopaedic Surgery
- Dr Adam Dowrick
  - Research Fellow, Department of Orthopaedic Surgery
- A/Prof Alison Street
  - Head, Department of Haematology
- Penny McCarthy, Megan Walsh
  - Haemophilia nurses, Department of Haematology
- Susan Findlay
  - Secretary, Department of Haematology